UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,793	07/12/2006	Masahide Shima	03200PCT	6046

23165 7590 02/17/2009

ROBERT J JACOBSON PA
650 BRIMHALL STREET SOUTH
ST PAUL, MN 551161511

EXAMINER	
VALENROD, YEVGENY	
ART UNIT	PAPER NUMBER
1621	
MAIL DATE	DELIVERY MODE
02/17/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,793	SHIMA ET AL.	
	Examiner	Art Unit	
	YEVEGENY VALENROD	1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 November 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11-17* is/are pending in the application.

4a) Of the above claim(s) *11,16 and 17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-9 and 12-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/10/08; 9/9/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The following is a non-final rejection of application # 10/585,793. This application has been transferred to Examiner Valenrod whose contact information is provided at the end of the instant document.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/10/08 has been entered.

Rejection of claim 10 is now moot since the claim has been canceled.

Rejection of claims 1, 4, 6-9 and 11 under 35 USC 103(a) is withdrawn in view of applicants remarks.

Rejection of claims 1 and 3 under 35 USC 103(a) is withdrawn in view of applicants remarks.

Rejection of claims 1 and 5 under 35 USC 103(a) is withdrawn in view of applicants' remarks.

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1, 3-9 and 12-15, drawn to a method of producing acrylic acid.

Group II, claim(s) 11, drawn to a water absorbent resin.

Group III, claim(s) 16 and 17, drawn to a process for producing a water absorbent resin.

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the water absorbent resin for group II has been disclosed in the art (Kondo et al., abstract; already of record) thereby breaking the unity of invention.

Claims 11, 16 and 17 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons stated above.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 11, 16 and 17 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-9 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Unverricht et al. (US 6,403,829; from here on '829) in view of Neher et al (US 5,387,720; from here on '720).

Summary of the instant invention

Instant invention can be construed as two steps performed in sequence: 1) Dehydration of glycerol to produce acrolein and 2) oxidation of acrolein to produce acrylic acid. Both steps are performed in gas phase. Specific limitations found in the dependent claims are discussed in the obviousness section of this office action.

Scope of prior art

'829 teaches step 2 of the instant invention, gas phase oxidation of acrolein to acrylic acid. '829 teaches oxygen present in the gas mixture (column 1, lines 3-4) and a 2-zone reactor for the process (column 10 line 1 and line 27). The amount of inert gas in the reactor is described as at least 20% (see claim 1).

Difference between prior art and instant claims

'829 only teaches the second step of the instant invention. The primary reference fails to teach the following limitations directed to the second step:

1) Dehydration of glycerol to prepare the starting material for the second step.

2) Single type reactor (claim 5).

3) Collecting the acrylic acid as a solution by using water (Claim 12).

4) Further purification of acrylic acid by distillation (claim 13).

5) Purification of acrylic acid by crystallization (claim 14).

Secondary reference

'720 teaches the first step of the instantly claimed process, the gas phase dehydration of glycerol to produce acrolein. Glycerol is provided as an aqueous solution with 10 -40 % glycerol content.

Deficiencies in the secondary reference

The main difference between the secondary reference and the instant claim limitation directed to the first step is the water content of the glycerol solution. Also, claim 15 is directed to a specific source of glycerol, while '720 is silent as to the source of glycerol.

Obviousness

In order for the rejection under 35 USC 103(a) to be proper, examiner must provide reasoning for why one skilled in the art would modify or combine the references in a way that would describe the claimed invention. In the instant case one skilled in the art wishing to practice the invention of '829, preparation of acrylic acid, would need to be able to obtain the acrolein starting material. While '829 utilizes oxidation of propene to produce acrolein, one skilled in the arts would reasonably be able to select from other known ways of obtaining acrolein. One such way is provided by '720. It is therefore the position of the Examiner that one would find it obvious to combine the two references

with an expectation that both processes will be performing the function as described in the art.

The specific limitations will now be addressed.

1) Water content of the glycerol solution in step 1.

While '720 teaches that preferentially 10-40 % glycerol concentration is preferred (60-90 % water) it the position of the Examiner that other water concentrations including those recited in the instant claims are within the scope of the process described in '720.

a) '720 teaches that the process is functional with greater glycerol concentration. (column 2, lines 52-56). Although the reference also teaches that the selectivity of the process is reduced, one might wish to reduce the water content in order to reduce the amount of waste water produced after the reaction. Selectivity of the process need not be the only concern governing the amount of water in the glycerol solution. Furthermore, '829 teaches 5-20% water in the gas entering the oxidation reactor. One skilled in the art would be further motivated to reduce the water content of the glycerol solution to a level that would be acceptable or ideal for the subsequent 2nd step. There is therefore both a motivation to reduce the water content and expectation of success in doing so.

2) Single type reactor

It is the position of the examiner that the type of reactor used in the process is a design choice of the person skilled in the arts. Both double type and single type reactors are known for gas-phase oxidation of acrolein. As evidence, Examiner refers applicant to Uchida et al. (US 4,871,700; already of record, column 8, line 41 and lines 53-54),

where a single tubular reactor is utilized. Absent unexpected results, the single type reactor is obvious over the double reactor of '829.

3) Collecting acrylic acid and purification of acrylic acid

Collection and purification of the product after a reaction are steps that are obvious to one skilled in the art. Such steps represent routine experimentation and Examiner has not uncovered evidence from the specification that would suggest that these steps are responsible for any sort of unexpected results.

4) Producing water absorbent resin from acrylic acid (claim 9)

The limitation of claim 9 directed to further utility of acrylic acid is treated as intended use of the product. One would be motivated to use the acrylic acid in situations where such use is desired. Producing water adsorbent resin from acrylic acid is known in the arts (see Kondo et al., abstract; already of record).

5) Source of glycerol (claim 15).

One skilled in the arts would find it obvious to use any known source of glycerol unless applicant can show unexpected results that are a function of the glycerol source.

Applicants' remarks

Rejection over the references in the instant office action has been made in the final office action dated 9/13/07. Examiner believes that the arguments made by the applicant in the remarks filed on 11/6/07 have been addressed in the instant office action. Particularly, a motivation to combine the references teaching the two steps of

the instant process and clear reasoning for changing the water concentration in the first step has been provided in the obviousness portion of the instant office action.

Conclusion

Claims 1, 3-9 and 11-17 are pending.

Claims 11 and 16-17 are withdrawn.

Claims 1, 3-9 and 12-15 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yevgeny Valenrod whose telephone number is 571-272-9049. The examiner can normally be reached on 8:30am-5:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Sullivan can be reached on 571-272-0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yevgeny Valenrod/

Yevgeny Valenrod
Patent Examiner
Technology Center 1600

/Paul A. Zucker/
Primary Examiner, Art Unit 1621